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ABSTRACT

A study investigated the effectiveness of the Writing Express program (similar to the "Writing to Read" program, but with the distinction that students write in their second-grade classrooms and follow thematic maps integrated into the regular classroom curriculum). All 895 second-grade students in six Writing Express schools and 6 non-Writing Express schools were pre- and post-tested in writing and spelling using researcher-developed measures. Researchers observed all of the 23 experimental classrooms shortly after the program was implemented and again toward the end of the school year to identify any improvements or changes. A questionnaire was administered to all teachers in the program. Results indicated that: (1) the program did not make a significant contribution to posttest scores in spelling, writing, vocabulary, reading, or total language scores; (2) differences in posttest scores among students in both the experimental and control schools were explained by their pre-spelling and pre-writing scores; (3) teachers felt that the majority of students made significant gains in the overall program goals of written expression, reading skills, spelling, and computer literacy; (4) teachers expressed a need for follow-up training to enable them to implement the program effectively; (5) teachers need more guidance in teaching writing as a process; (6) students rarely revised their work; (7) teachers were rarely observed facilitating students' writing development; (8) teachers and students had positive attitudes about the program in general; (9) students enjoyed writing at the computer; and (10) students were familiar with word processing and basic computer technology skills. (Six tables of data are included.) (RS)

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WRITING EXPRESS: AN EVALUATION OF A FOLLOW-UP PROGRAM TO WRITING TO READ

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WRITING EXPRESS: AN EVALUATION OF A FOLLOW-UP PROGRAM TO WRITING TO READ

PURPOSE

Because of the emphasis on writing and on the implementation of a whole language philosophy, DeKalb instructional personnel were anxious to continue students' experiences with writing and with computers into the second grade year. With this continued experience, students would be better writers and the skills learned from writing would transfer into reading, spelling, and the other language arts. Furthermore, students would continue to develop their computer literacy skills and begin to move away from phonemic spelling to more traditional spelling. Evaluators, therefore, sought to assess whether the Writing Express program made a difference in students' writing, reading, spelling, and computer literacy skills. In addition, evaluators provided information regarding the program's strengths and weaknesses which could be used for improvement.

The Writing Express program is like Writing to Read in that it follows a station concept and features digital images and brightly colored animated graphics to stimulate students affectively. The program is unlike Writing to Read in that students write at computers located in their classrooms and follow thematic maps which are designed to be integrated into the regular classroom curriculum. Writing Express was developed by an independent computer engineering company and is being used in schools throughout the country. Few independent studies have been conducted on Writing to Read and, to date, no studies are in progress to evaluate the effectiveness of Writing Express.

During the year of the program evaluation, the school system had implemented Writing Express in a total of 51 schools over the last four years. The remainder of the schools would receive a program according to a schedule dependent upon release of bond money.

METHODS

Six Writing Express schools were matched with six non-Writing Express schools using schoolwide Iowa Tests of Basic Skills (ITBS) scores and schoolwide percentage of free and reduced lunch (Fehrmann, P. G., 1987, Home influence on school learning: Direct and indirect effects of parental involvement on high school grades. Journal of Educational Research, 80, 330-337). All second grade students (N=895) were pre and posttested in writing and spelling using researcher-developed measures. At least one researcher and sometimes two observed in all of the experimental classrooms (N=23) shortly after the program had been implemented and then again toward the end of the school year to identify any improvements or changes. Researchers provided feedback to the program coordinator throughout the evaluation process, although the six experimental schools were not identified to the coordinator until the study was completed. A mid-evaluation report containing detailed findings from field notes was presented to the coordinator and her assistant in late February.

Data Sources

Data were collected from numerous sources and triangulated where possible. Quantitative data sources were ITBS achievement test scores, pre- and post-writing and spelling samples (Appendixes A and B), a computer technology checklist (Appendix C), and a teacher questionnaire (Appendix D) administered to all teachers in the system implementing the program. Throughout the evaluation process, the program coordinator provided input into the contents of the teacher questionnaire, writing and spelling samples, administration procedures, and the computer technology checklist. Qualitative data sources included comments from the teacher questionnaire (Appendix E), field notes from teacher training and from classroom observations (Observation Guide-Appendix F), and informal teacher and student interviews. The qualitative data helped to answer the why regarding some of the quantitative results.

Data Analyses

Because students were not randomly assigned to treatment, group scores were used for matching. Therefore, alternative statistical control of possible sources of errors was made by using the pre-spelling scores, pre-writing scores and gender of each student as baseline data.

Gender is known to influence achievement in the early grades, and pre-spelling and pre-writing are indirect measures of parents' education. Analysis of variance (ANOVA) and t-tests were conducted to determine if Writing Express made a difference to student scores in the experimental schools as a group or when matched with student scores in the control schools. In addition, regression analyses were conducted to estimate the separate effects of the Writing Express treatment in comparison to the pre-spelling, pre-writing, and gender on the posttest scores.

LIMITATIONS

Dependent Variables

1. The ITBS items as an outcome measure were not directly related to the content taught. The expectation, however, was that because the skills to be developed in the treatment were correlated to the same skills in the school curriculum, building for transfer would take place and the effects would be reflected on the ITBS scores.

2. The writing measure was not discriminating enough to measure growth of those students who scored high on the pretest. For example, a student who scored 29 on the pretest would fail to show much gain if he/she scored the maximum of 32 on the posttest.

3. Writing samples were scored by one rater; two would have been more desirable but time and staff were issues that had to be considered. Scorers were trained, however, and the WE program coordinator and her assistant attended the training and provided input throughout the session. Interrater reliability was established at the end of the training. In addition, scores were spot checked by the trainer.

4. Students' pre- and post-writing samples may have been hampered because of using paper and pencil rather than the computer. The non-treatment group may have been at an advantage because the treatment students practiced on the computer.

Independent Variables

5. The experimental schools were in their first year of implementation. On the other hand, teachers knew that the Writing Express program was being evaluated and that their schools were in the study which could result in the Hawthorne Effect.

6. Students in both the treatment and the control schools were not randomly assigned. The

evaluators have no way of knowing that the matching on free and reduced lunch would actually translate to matching of parental education and income, even though this is the most available and the most used indication by researchers. The schools' average ITBS scores were used by observations to match the schools, and there was no way to know whether the normal distributions within and between the two sets of classrooms were the same since no statistical tests were conducted.

7. Teacher effect could have differed in the two sets of schools, although all teachers had received satisfactory evaluations on the Georgia Teacher Evaluation Program (GTEP), the state's official teacher evaluation program.

Control of the Sources of Error

The control of the above sources of possible errors by holding all independent variables constant except the treatment was difficult to implement in practice. Hence, to counteract the above, pre-writing and pre-spelling scores (possible sources of error) were used as baseline measures of performance to determine in a regression analysis of the data their separate effects when compared to the treatment. Different raters scored the students' pre- and post-writing samples to control interrater bias (Scoring Guide, Appendix G). Gender effects were also determined in relation to the treatment. The posttest scores were used as the main dependent variables, although the gain scores were used as a source of reference.

RESULTS

Student Achievement

Has the Writing Express Program made a significant difference to students' ITBS scores in the experimental schools as compared to students' scores in the control schools?

The results of an analysis of variance on the variables for which posttest data are available indicate limited, if any, program effectiveness (Tables 1-5). Table 1 shows that the mean post-spelling and writing as well as the gain scores are marginally higher for students in the experimental than in the control schools. Conversely, the ITBS scores are marginally higher in the control schools than in the experimental schools. The results of an ANOVA indicate that these differences are not statistically significantly different at the .05 level.

When the schools are grouped by experimental ($n=6$) and control ($n=6$), no significant

TABLE 1

Results of an Analysis of Variance of Posttest Scores on Students in Writing Express Schools (experimental) and Students Not in Writing Express Schools (control)

	Spelling Mean	Writing Mean	ITBS Vocabulary Mean	ITBS Reading Mean	ITBS Total Language Mean
Experimental (n=560) Posttest gains	15.28 [4.02]	19.50 [2.49]	29.98	30.94	33.80
Control (n=335) Posttest gains	14.77 [3.57]	18.75 [2.31]	31.49	31.95	34.49
F Ratio	1.503	1.596	3.528	1.419	.647
F Probability*	.221	.207	.061	.234	.422

*The probability in each case is greater than .05 and, hence, the two means for the respective control and experimental schools are not statistically significantly different. However, the students in the experimental schools have marginally higher mean posttest and gain scores in spelling and writing and lower vocabulary, reading, and ITBS total language scores. Data are not available for ITBS pretest scores.

differences exist in the mean scores. Yet when paired in Table 2, some significant differences exist in favor of three experimental and two control schools:

Ashford Park (experimental) over Huntley Hills in ITBS reading scores,

Briar Vista (experimental) over Henderson Mill in writing,

Mainstreet (experimental) over Allgood in spelling,

Fernbank (control) over Stone Mountain in spelling and ITBS vocabulary, reading and total language,

Brockett (control) over Hambrick in writing.

The other differences noted in Table 2 are not statistically significant.

What variables explain the differences in both the experimental and the control schools?

Table 3 shows the Pearson product-moment correlation coefficients of pre-spelling, pre-writing, treatment, and gender in relation to the posttest scores. The data indicate that pre-spelling and pre-writing are significantly related (.001 level) to posttest scores in spelling, writing, ITBS vocabulary, reading, and total language. Gender is not significantly related to the pre-spelling and pre-writing scores but significantly related to the posttest scores. The negative correlations indicate that girls (coded 1) obtained higher posttest scores than boys (coded 2). The treatment is not significantly related to the posttest scores except with respect to ITBS vocabulary where a correlation of -.062 is significant at the .05 level because of the large number (895) in the sample.

Because of the inter-correlations among the variables, knowing their strongest bonding or communality is important. The results of factor analysis in Table 4 show that all the achievement variables are loaded in Factor 1 while gender and treatment are loaded in factors 2 and 3 respectively. This means that the pretest scores and posttest scores are more strongly related among themselves than with gender and the treatment. The strong bonding between the pretest scores and the posttest scores may be termed the "vicious achievement syndrome", where the low achievers tend to remain low (even after treatment) and the high achievers tend to soar higher. In other words, the high get higher and the low are still low even though they have made gains.

As indicated in the correlation coefficients and the factor analysis, the pretest and posttest scores are highly inter-correlated, while gender is not significantly related to the pretest scores

Table 2

Results of a t-test of Posttest Scores by Paired Experimental and Control Schools

Schools	Students (n)	Spelling Mean	Writing Mean	ITBS Vocabulary Mean	ITBS Reading Mean	ITBS Total Language Mean
Experimental:						
Stone Mtn.	134	13.93	19.75	29.47	31.43	31.99
Control:						
Fernbank	73	16.67+	17.80	35.45+	35.14+	39.03+
t-value		-3.46	1.41	-3.39	-1.98	-4.17
Probability		.001	1.62	.001	.050	.000
Experimental:						
Ashford Park	64	15.22	19.05	30.63	31.42*	36.05
Control:						
Huntley Hills	25	11.89	17.28	27.04	25.72	33.32
t-value		1.75	.80	1.36	2.11	.84
Probability		.088	.431	.182	.041	.405
Experimental:						
Hambrick	92	16.07	18.54	29.67	29.26	32.25
Control:						
Brockett	58	15.42	21.67+	31.64	32.40	35.10
t-value		.73	-2.31	-1.03	-1.72	-1.53
Probability		.470	.022	.305	.088	.129
Experimental:						
Jolly	60	15.35	18.58	31.42	31.73	35.80
Control:						
Laurel Ridge	51	15.96	20.57	32.86	34.86	35.53
t-value		-.55	-1.13	-.57	-1.18	.10
Probability		.581	.262	.570	.241	.918
Experimental:						
Briar Vista	48	16.02	21.50*	28.77	32.17	36.81
Control:						
Henderson	49	13.96	15.94	29.82	28.47	31.14
t-value		1.52	3.18	-.34	1.21	1.77
Probability		.132	.002	.735	.228	.080
Experimental:						
Mainstreet	163	15.74*	19.80	30.12	30.67	33.73
Control:						
Allgood	79	13.19	18.53	29.30	30.93	31.63
t-value		3.01	1.12	.59	-.18	1.31
Probability		.003	.266	.558	.861	.193

* Experimental Mean is statistically significantly different from the control.
+ Control Mean is statistically significantly different from the experimental.
In each case the differences are significant at the .05 level or less.

TABLE 3

Correlation Matrix of Selected Writing Express Variables
(N=895)

	GENDER	PRESPELL	SPELLPOST	PREWRITE	WRITEPOST	ITBSVOC	ITBSREAD	ITBSLANG	TREATMENT
GENDER	1.00000								
PRESPELL	-.05380	1.00000							
SPELPOST	-.10631*	.48027*	1.00000						
PREWRITE	-.05545	.65574*	.37693*	1.00000					
WRITEPOS	-.11419*	.37524*	.54533*	.31687*	1.00000				
ITBSVOC	-.01876	.52918*	.46961*	.45664*	.34706*	1.00000			
ITBSREAD	-.04920	.50829*	.45736*	.42616*	.37146*	.81559*	1.00000		
ITBSLANG	-.08782*	.56862*	.48082*	.49147*	.40906*	.80071*	.79120*	1.00000	
TREATMNT	.02899	.00379	.04318	.02790	.04193	-.06166*	-.04005	.02909	1.00000

* With a sample of several hundred, a correlation coefficient of .06 or above is statistically significant at the .05 level.

TABLE 4

Factor Analysis of Selected Writing Express Variables (N=895)

	FACTOR 1	FACTOR 2	FACTOR 3
ITBSLANG	.88264*	-.04561	-.10113
ITBSVOC	.88017*	.05311	-.15881
ITBSREAD	.86376*	.01639	-.14427
PRESPELL	.75749*	-.09708	.13464
PREWRITE	.67808*	-.07203	.16568
SPELPOST	.63695*	-.34584	.24543
WRITPOST	.52084*	-.42694	.28547
GENDER	.03443	.89966*	.13267
TREATMNT	-.04053	.07826	.89716*

* Loaded in corresponding factor

in spelling and writing but is related to the posttest scores. Treatment is significantly related to ITBS vocabulary. Yet would these relationships hold true in a regression analysis of the data? Regression analysis allows the independent variables to interact simultaneously with the dependent variable, and then separates out the independent effect of each independent variable (holding the others constant) with the dependent variable. The results are shown in Tables 5 and 6. In Table 5 the order of prediction is pre-spelling, pre-writing, and gender with respect to the posttest scores; treatment is insignificant.

Overall, there are low to high scores in both experimental and control schools (patterned after the normal distribution). As previously noted, students who are low on the normal distribution in each school tend to perform low and those high tend to perform high accounting for no significant differences in the ANOVA (Table 1). A break-down of the scores in paired schools show some differences, but these differences with and across schools are accounted for by the pretest scores and gender. The control schools are significantly stronger in vocabulary. However, 69 percent of the variances have not been explained meaning that other, more powerful variables need to be studied to account for change in test scores.

Teacher Questionnaire

Did teachers perceive that the Writing Express program was effective?

On the questionnaire administered to all Writing Express teachers, 129 teachers responded about their perceptions of the Writing Express program's effectiveness. Items asked teachers to respond to general items about program goals and to more specific items about skills related to those goals. Complete questionnaire results are in Appendix D and are triangulated with the appropriate category in the detailed discussion of the findings. Items 1-10 refer to the program's overall goals. Seventy-four percent of the teachers (combining *agree* and *strongly agree* responses) reported that students made significant gains in such overall program goals as written expression, reading skills, computer literacy, and cooperative social and learning skills. However, listening and spelling skills were below 65 percent agreement. Thus, in contrast to the student achievement data, teacher perceptions moderately to strongly support that Writing Express is achieving its goals.

In contrast to their positive responses about goal achievement, teachers were less positive about Writing Express contributing to gains in specific skill areas. Teachers were asked to

Table 5

Results of Regression Analyses: The Beta Coefficient Contributions made by Each Independent Variable to the Respective Dependent Variable (N=895)

Variables			Dependent		
Independent	SpellPost Beta	SpellGain Beta	WritePost Beta	WriteGain Beta	Significant
Pre-spelling	.405	-.625	.288	.235	.001 or less
Pre-writing	.109	.104	.126	-.791	.005 or less
Gender*	-.081	-.087	-.094	-.077	.05 or less
Treatment*	.037	.035	.039	.031	not significant
R Square Ch.	.242	.315	.156	.436	
Percent Variance	24	32	16	44	

*Gender (male=2; female=1); Treatment (Experimental=2; Control=1)
A Beta coefficient is significant at the .05 level if it is .06 or above.

Pre-writing and pre-spelling skills predict posttest scores. The negative beta coefficients indicate that students who were low on pre-spelling and pre-writing made higher gains (as could be expected). Gender is negative, meaning females (coded 1) scored higher than males (coded 2). The contributions made by Treatment is insignificant, meaning that in both experimental and control schools the pre-spelling and pre-writing scores predicted the posttest scores. The percentages of variances in each case is less than 50, hence some key predictors have not been included.

Table 6

Results of Regression Analyses: The Beta Coefficient Contributions made by Each Independent Variable to the Respective Dependent Variable (N=895)

Variables		Dependent	
Independent	ITBS Total	ITBS Vocabulary	ITBS Reading
Pre-spelling	.431***	.402***	.401***
Pre-writing	.208***	.197***	.167***
Treatment (E=2; C=1)	-.035	-.070**	-.047
Gender (M=2; F=1)	-.052*	.015	-.018
R Square Ch.	.351	.306	.276
Percent Variance	35	31	28

Significant Level *** = .000; ** = .01; * = .05
Pre-spelling and pre-writing significantly predict ITBS scores.
The control schools accounted for some vocabulary scores, and females accounted for some ITBS total language scores.

check the range of percentages of students who demonstrated significant gains in these skills after going through one Writing Express thematic map. Reading skills were detailed (items 11 through 17), and responses varied from a low of 40% to 68% with a mean of 51% that 75-100% of students made significant gains in all skill areas. The remainder of the teachers stated that below half of the students made significant gains.

When the writing skills were detailed (items 18-25), an average of 60% of the teachers responded that 75-100% of the students made significant gains in all skill areas. The range of responses varied from a low of 28% to 66% with an overall average of 60%. One third stated that 75-100% of their students made significant gains in revising and editing stories. Conceptually, these are the dimensions that would indicate growth if performed by students.

When the creative skills were detailed (items 26-30), 40% of teachers responded that 75 to 100% of the students gained significantly in all areas. About one third of teachers observed that 75-100% of students used different approaches and complex sentences. On items 31-34 relating to spelling skills, 45% of teachers responded that 75 to 100% of students made significant gains. With respect to computer literacy skills (items 35-37), 73% of teachers responded that 75 to 100% of students gained significantly.

When asked in general if the Writing Express program was effective in motivating students of varying abilities (items 38-41), teachers' responses averaged 53% that the program was effective in motivating 75-100% of students. When asked about specific types of students, teachers reported that the program is more effective for motivating average (63%) and high achieving students (71%) than for ESOL students (34%) and low achieving students (42%).

With respect to the students who were previously low achieving, 31% of the teachers responded that the majority of students made significant gains in the overall goals (items 42-53). A few teachers noted that they had no low achievers in their classrooms.

Did teachers perceive that the content of the Writing Express program was relevant to teachers' and students' needs?

With respect to usefulness to teachers as indicted by the extent to which they like having the program (item 54), the program enhanced their instruction (item 55), they incorporated the program into their regular instruction (item 57), the program helped them to discuss students' language development (item 59) and computer skills with parents (item 60), and to hold a

positive attitude (item 61), teachers responded favorably in a range of 75 to 81%. However, almost half indicated that the program created extra work (item 56); almost 70% indicated scheduling had been difficult but worthwhile (item 58).

With respect to meeting the learning needs of students of varying abilities, teachers agreed or strongly agreed in a range of 82 to 94 percent that Discovery, Travel Log, and writing at the computer were relevant and that students enjoyed working at the computer (items 62, 63, 66, and 67). Fewer teachers (64% and 58%) agreed that SHARE and listening/recording were appropriate. Twenty-seven percent of teachers were indifferent to those items; therefore, the lower percentage of agreement could be that students did not participate in these stations as frequently as in the others if at all.

Regarding the degree of utilization (items 68-70) over 70 percent of the teachers agreed or strongly agreed that students used the programs frequently and completed a writing assignment once a week or more. When asked whether some students were pulled out for other programs (item 71), 28% reported that students were pulled out often or almost always, indicating that some students are not able to use the Writing Express as regularly as other students. Regarding other uses, 35% of the respondents reported using the computers for other writing assignments, and 25% reported using the computer for other activities.

Was the teacher training adequate?

Teachers reported (86%) that they implemented the program within two months of receiving their training (item 74). Teachers also agreed or strongly agreed (70% or above) that during training the following were explained in ways that were useful on the job: the expected outcomes of the program, how components would influence outcomes, and actual practice in computer use (items 75, 76, 80 respectively). Just under 70 percent, however, reported that the following were explained in ways that were useful on the job: integration with the curriculum, scheduling into the curriculum, scheduling students at different stations, and techniques of teaching writing as a process (items 77, 78, 79, and 81 respectively). Furthermore, only 29 percent and 34 percent agreed or strongly agreed that one day of training was adequate and that they had received sufficient follow-up training.

Were the support services adequate?

In response to items 84-88, just over 70% percent of teachers stated that they were supported by having adequate equipment and supplies, they had few problems which were quickly remedied, and they were supported by central office personnel. Teachers reported less support from IBM personnel, although 29% responded "indifferent" to this item, possibly indicating that they had no need for services from IBM personnel.

Did teachers feel comfortable and confident using computer technology?

Over 40 percent of teachers reported that they had 10 or more hours of computer experience prior to Writing Express training. Furthermore, over 75 percent reported that their previous experiences were positive and 85 percent reported that they felt comfortable using a computer. These positive responses indicate that teachers' discomfort with computer technology was minimal and, therefore, would probably not have affected implementation.

What are teachers' perceptions about students' readiness to learn touch typing?

Sixty-three percent of teachers agreed that students are familiar enough with the keyboard to learn touch typing, and over 70 percent agreed that typing could be included as part of the Writing Express Program.

Cost

The 1989 purchase order lists the following cost per classroom:

IBM hardware	$6098
Knowledge Engineering hardware	
(tape players, CD ROM, headsets, etc.)	$1402
Furniture	$ 205
Knowledge Engineering software	$1259
Training and installation	$ 400
	total $9364

Qualitative Data Triangulated with Other Data Sources

Classroom observation data may help to explain why the quantitative results indicate that the Writing Express program made no significant impact on students' post-spelling, post-writing, and post-ITBS scores. In the section that follows, results from student achievement data, the teacher questionnaire, and classroom observations are triangulated and categorized so that the results may be viewed holistically.

Equipment/Supplies/Materials

Equipment

All classrooms had the required one printer and one computer at the Discovery station and four at the Writing station. Observations and teachers' comments revealed only occasional problems with equipment and supplies. Some teachers commented that they had not received the audio tapes; some teacher questionnaire comments supported that teachers either did not have enough or had not received the tapes. In addition, some comments from the questionnaire and from observations indicated need for more equipment with larger number of students. On the questionnaire, 84% of teachers reported that they had adequate equipment and supplies and, 72% reported that they had few equipment or software problems. Thus, the teacher responses supported the observations.

Materials and Their Content

Students appeared interested in the topics and especially enjoyed the content at the Discovery station. Yet six teachers on the questionnaire and two teachers who were observed suggested the need for more books and/or supplemental materials which may indicate a need to emphasize to teachers to bring in, or have students bring in, more materials and information. In other words, teachers may need to be shown **how** to supplement the program. One teacher complained that because her students had lost so many of the library books that were checked out in her name and for which she was responsible for paying, she had to stop allowing books to be checked out of the media center. Yet it is imperative that students have sufficient background knowledge to write about a topic. No problems were noted with quality except for two teachers who commented about the difficulty in discerning some words pronounced by the audio voice.

Several teachers commented that the Travel Logs were repetitive and boring. Furthermore, teachers told the researcher that sometimes students "zipped through" the exercises and, therefore, "did not get all they needed to out of it." This was confirmed in the observations, as students often worked through the exercises quickly, appearing to give little thought to their responses. The other stations, SHARE and listening\recording, were rarely, if ever, observed to have students working there.

Appropriateness to Various Learners

One teacher said to the researcher, "Students in Discovery are bored with it." Yet another teacher volunteered, "... top and low kids love the computers." One teacher who was having trouble with her students working independently admitted that the program "sounds great; it's just not working with these kids." Students who seemed to have less ability and/or less interest were often pointed out to the researcher as REP students. They seemed to be more easily distracted and off-task while at the computer. This particular type of student might need more guidance in writing, more careful monitoring by the teacher, and/or more knowledge of the subject area.

A few teachers went so far as to comment on the appropriateness of the materials to various levels of learners. Comments were mixed saying that the materials were appropriate for underachievers and ESOL students but not for average and high achievers; yet some indicated that the materials were "great" for high achievers. These mixed comments were supported by the questionnaire responses (items 62-67).

Achievement

Computer Literacy

The researcher used the Computer Technology Checklist to observe 46 students (23 boys and 23 girls, 20 whites, 23 blacks or Afro-Americans, and 3 others) representing each of the experimental classrooms. The Checklist is marked with the usual function keys used and a few notes in Appendix C. The researcher attempted to observe students from beginning to end, but often could not see them print because they were not finished or because a few teachers did

not allow students to print. Teachers did not allow students to print their own stories because the printer had been broken when students printed, because the teacher preferred to be in charge of the printing, or sometimes because there had been a problem with students rolling the printer backwards or with tearing off the paper.

Generally, students were observed working independently at the computer; all students were able to get on the Discovery station and the word processor with no problems and were able to do the majority of general, necessary tasks on the computer checklist. In fact, almost all students who were observed could do basic skills, e.g., space bar, arrow key, backspace to delete, enter key. In one class, however, students were playing computer games and, therefore, were using only the arrow keys and space bar. Their teacher reported that they could do almost everything on the computer checklist.

All comments were positive regarding students becoming computer literate. Early observations indicated no real problems even though students were just learning the computers and the word processing program. Some teachers showed frustration by being called over to the computer to answer a technical problem, sometimes one they could not answer. A few teachers pointed out that there is a "big difference" in students who have been in DeKalb and those who have not. This knowledge of and comfort with the computer was attributed to the Writing to Read program.

On the questionnaire, teachers' positive responses about computer literacy and technology skills were confirmed when the researcher used the checklist during the end of the year observations. In addition toward the end of school year, the researcher noticed that some students seemed to know where letters where located on the keyboard and were typing very quickly. When this observation was mentioned to the program coordinator and she said that the issue of teaching typing skills had been raised, the researcher added a couple of items on the questionnaire. One teacher said that the fourth grade teachers who teach keyboarding skills complained that the students had learned bad habits and, therefore, these teachers had to reteach skills. Questionnaire responses indicated that there is some support for teaching touch typing.

Writing/Reading/Spelling/ and Other Language Arts Areas

Statistical analyses of the results indicate that students who had used the Writing Express program made no significant gains in spelling, writing, or ITBS scores. Yet teachers reported on the questionnaire that their students had made significant gains in these areas as a result of the Writing Express program. Observational data may explain why students failed to show significant gains at this point.

Spelling

Observations indicated that the majority of students were aware that there is a correct way to spell a word as they asked someone how to spell, used pictionaries or another source for a reference, and/or used the spellchecker. Furthermore, many teachers were observed emphasizing spelling, e.g. marking spelling errors on the students' stories, listing a "word bank" on the bulletin board, having pictionaries by the computers. Yet many students continued to spell phonemically, especially irregular words, e.g. "buitiful" for beautiful. The spellchecker is ineffective when students fail to approximate correct spelling. Spelling samples and ITBS language scores indicate that students who used the Writing Express program were as good as or better than students who were not in the program, except for those students at Stone Mountain.

Writing

Students' writing development ranged from short, choppy sentences to lengthy (several paragraphs), cohesive, creative stories. Many students, especially in the initial observations, wrote lists of facts about a topic. This could be attributed to students' stage of development as well as to the topic.

One teacher noted that the students who write more creatively tend to be those who are more risk-taking. Those who tend to write factual stories, seem to stay factual. She went on to say that whatever type of story a student wrote did not seem to be related to his/her ability.

Another teacher pointed out that "When students sit at a desk, they have a hard time writing, but seem to open up when writing at the computer." In addition, "students feel more success if they can do this on their own--by themselves." This particular teacher had written simple, detailed directions to help students be independent at the stations.

All of the observed teachers in the experimental schools indicated that they thought their students' writing was improving. Toward the end of the year, students were observed writing more creative, cohesive, and lengthier stories. In fact, some students were writing multiple chapter stories. Writing long stories seemed to be trendy as students announced what chapter they were beginning or how many pages their story covered. When reading some of these lengthier stories, however, the chapters were not related and the writing was poorly developed and rambling. Curiously, at the end of the year, two students in one classroom were observed copying stories directly from trade books.

Teachers' comments indicated an overall feeling of improved skills, especially in the area of writing. Some commented that only the better students improve, however. In the observations, students read over errors and sometimes said something like, "that didn't sound right." Also, some students failed to catch errors when they listened to their stories being read by the computer. One teacher said that as students read their stories aloud to her, they catch their mistakes, but if the computer reads it to them, the students do not catch their errors. The question arises, then, that if teachers do not respond to students' stories and students do not revise or even notice their errors, can students' writing or any other related skill improve?

Interestingly, some teachers indicated that students at this level were not ready to proofread. While proofing, revising, and editing are important phases in writing, it might be true that many students at this level are not ready - or are not able - to revise; proofing and revising may be related to a student's developmental stage. Whether or not the ability to revise is developmental for students needs further research.

In addition, the researcher observed that the time students had to produce or write ranged from 10 minutes to an unlimited amount of time. Questionnaire responses indicated that 71% of teachers scheduled students at the writing station for 16 or more minutes. Any less than 20 minutes would hardly be enough time to write a well-developed story. Furthermore, 76% of

teachers reported that students complete a writing assignment once a week or more, and 78% reported that students used some aspect of the WE program two or more times per week. The question arises as to how much time needs to be spent on writing to produce significant gains in student achievement.

Another possible limitation to the WE program is that it controls the selection of topics. Writing research supports the fact that students need to self-select their own topics. In a few instances teachers said that they allowed students to write about issues that were relevant to them.

In the final observations, several students in one class were filing their stories under unrelated titles, e.g. "p-p-p" and "pop-pop." When asked why, one girl said that the secret word was too long. When asked about some of the other strange titles in her directory, she was unable to tell me what the some of the stories were about. Another student had filed his story about the secret word "telescope" under "baseball." When asked why, he said that he liked baseball.

Over half of the teachers had displayed students' writing in the classroom and /or in the hall. Some teachers had laminated and bound students' stories in a book by topic. This was evidence that students' writing was being published and teachers valued students' writing efforts.

Thinking and Other Skills

Observations revealed that students were formulating their own thoughts as they wrote, although many were listing facts. Students did have to follow directions carefully to use the computer and printer. Also, students were using trade books at the Browsing station to expand their knowledge about topics, and a few students used pictionaries to spell words correctly. An average of 40% of teachers reported that 75-100% of their students had demonstrated significant gains in creativity. In addition, a few teachers commented on how the Writing Express program enhanced creative thinking, following directions, or reference skills.

Attitude

Upon visiting the classrooms teachers said that "Students love it," and several students readily shared their stories. When asked, students said that they liked the program. From the

observations, all students appeared to enjoy the Discovery station and the majority seemed to enjoy the Writing station. Yet some students wrote very little and were off-task at the writing station. Almost all teachers responded that students enjoyed working at the computer and this was confirmed in their written comments and in verbal comments to the evaluator. Teachers, 86%, reported that their overall opinion of the program was positive. Theoretically, this positive attitude of both teachers and students would impact on student achievement. A few teachers commented negatively about the expense of the program expressing the following issues: teachers had to do without other things and the training was not sufficient to prepare them to implement the program effectively.

Implementation

Scheduling/Time/Management

Trainers emphasized the importance of trying different schedules to discover what works best, as the program is designed to be flexible and adaptable. The researcher observed that scheduling and management varied throughout classrooms. Some students were observed using the Writing Express during the language arts block while some used it throughout the day. As mentioned previously, time at the Writing station varied from 10 minutes to however long students needed to complete a story; trainers had recommended 20 minutes.

Although teachers pointed out that the program's flexibility was an advantage and that the program was worthwhile, numerous teachers commented about problems with scheduling because of so many other things to do and because of pull-out programs. One teacher admitted that, while the program was going great at her present school, there was "no way I could have done this at the other school." She went on the explain that these students work well on their own, but at the other school, lots of students were in and out plus their behavior was poor, e.g. fighting, cursing. So at least in this teacher's perspective, the program's success is largely dependent upon the type of student and the schedule.

A few teachers were observed allowing only those students who had finished their seatwork or who were being the "best workers" to go back to the Discovery and/or Writing stations. If it is standard or frequent practice that only the better students were using the WE program in some classrooms and that lower achieving REP students were pulled out in some classrooms, then the better students would naturally "soar higher," if indeed the Writing Express

program contributed to increased achievement. Several teachers mentioned that scheduling was difficult for those students who were pulled out for other classes. Over one fourth of teachers reported that students were often or almost always pulled out during Writing Express time.

Almost half of the teachers responded that Writing Express had created a lot of extra work for them. Yet almost 70 percent admitted that while scheduling had been difficult, the program was worthwhile. As with any commercially developed program, students cannot be totally independent. Therefore, teachers need help integrating WE into the curriculum and with developing a manageable schedule. Teachers also report that seeing a successful program "in action" would have been helpful.

Training

Almost two thirds of the respondents disagreed that one day of training was sufficient. Teachers report that the training they had was good there was "...just not enough of it." One teacher commented, "...the county spent so much money on this equipment yet we were hardly trained." Teachers suggested that the training needed to be longer than one day; visits to other schools would be helpful; and follow-up training is needed after implementation along with brainstorming sessions with other teachers. One third reported that they had received sufficient follow-up training; yet almost one fourth of the teachers were indifferent to that item, possibly indicating that they did not feel follow-up was necessary. Teacher comments, however, strongly indicated a need for more training and continued follow-up once the program is implemented.

Table 3 in the questionnaire details training areas that were explained in ways that were useful when implementing the program. The weakest area was teaching writing as a process. As discussed with the program coordinator, the allotted time for training cannot include all that teachers need to know. The observations confirmed that teachers were not facilitating students' writing development. One teacher asked the evaluator, "What am I supposed to do with their writing?" One teacher was concerned that because she did not have time to "grade everything" that students were making the same mistakes over and over.

Assistance Needed

In the observations, the researcher noticed that teachers had enlisted the support of other students, a media aide, and a friend who was on vacation from college. The student "engineers"

were usually students who were knowledgeable of the computer and/or advanced students. Teachers made several comments about the need for additional help. For example, "Students need assistance at the computer stations and especially while writing. Help is also needed at the recording station. Students cannot work totally independent of a teacher or other adult." One teacher echoed the need for "... more hands, eyes, ears." Specifically, teachers pointed out that students needed guidance as they wrote.

Integrate with Curriculum

Trainers mentioned how concepts could be applied to this program and that teachers could "Choose what will fit in with your teaching." In addition, the teacher's manual states that the WE "... should be integrated with your normal classroom activities and personalized to meet the language development goals set by you and/or your district" (p.3.1). The researcher observed either directly or from evidence that several teachers were integrating the WE into the other curricula, primarily language arts, social studies, and science. For example, one teacher pointed out that she used the students' writing to teach concepts rather than the assignments in the English book. In addition, she said she tried to point out to her students to use these concepts in their own writing.

Over three fourths of the teachers reported on the questionnaire that they were able to incorporate Writing Express into their regular curriculum. Yet a major discrepancy exists between questionnaire results and observations because the researcher failed to observe this in most cases. In fact, teachers seemed to perceive that the program was an added component to the curriculum rather than a supportive element to instruction as they said that there simply is not enough time to do Writing Express and the regular curriculum too. It might be that some teachers need more knowledge about **how** to incorporate WE into the curriculum. On the other hand, one teacher noted that students seemed to find the topics they were not studying in other subjects the most fascinating.

A few teachers wrote comments about how the WE program will work well with the whole language approach. Because the school system is adopting a variation of the whole language philosophy, future training might include ways that WE can support a whole language philosophy to instruction.

Teachers' Role in Teaching Writing

Even though one of the trainers mentioned that the teacher was to do the job of "writing coach," few teachers facilitated student writing. In fact, many teachers seemed unclear of what to do in helping students as they wrote and in responding to students' stories. Without prompting, some teachers offered comments similar to," I don't know what I'm supposed to do with their stories. I don't have time to correct everything. " Yet one teacher said that they were not doing any "critiquing" of students' writing because students were "...just not ready for it yet."

Teachers were observed doing little in the way of helping students through a process approach to composing; yet, when teachers provided feedback, usually the teacher had done the revision. Therefore, it appears that teachers, except for a few, were not facilitating students' writing development. Toward the end of the school year, the researcher observed more teachers helping students. Teachers were making more positive comments, although the comments were still of a general nature. Generally, teachers were more encouraging about students' attempts at writing. Overall, teachers seemed more comfortable with the program.

Yet some teachers were never observed at the Writing Station, and some came back only when students were ready to print or if there was a question or problem. Much of the help was of a technical and/or grammatical nature. Teachers helped with commands, with printing, and/or with correcting students' mistakes especially with spelling. Other teachers monitored the writing station closely. Nevertheless, even these teachers did little to facilitate writing instruction.

Used for Other than Writing Express

Occasionally, the researcher observed students drawing or playing games. A few teachers also told the researcher that students sometimes used the computer for writing other than for Writing Express topics. For example, one teacher said students had written letters to U.S. troops in the Persian Gulf; another teacher had the students writing thank you notes to a group who had performed at a school assembly. A little over one third (35%) of teacher respondents reported that computers were used for other writing assignments; one fourth reported computers were used for activities other than writing, such as playing games or math skills.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Statistical analyses of student achievement data, teacher questionnaire results, and observations triangulate to support the following conclusions and recommendations.

1. The Writing Express program in the six experimental schools did not make a significant contribution to posttest scores in spelling, writing, ITBS vocabulary, reading, or total language scores.

2. Differences in posttest scores among students in both the experimental and control schools were explained by their pre-spelling and pre-writing scores indicating that skills that students had upon entering the program rather than treatment determined posttest scores. Gender also made a small but significant contribution to posttest scores in spelling, writing, and total ITBS scores, indicating that females in both the experimental and control schools gained more than males in the second grade.

3. Teacher questionnaire responses indicated that the majority of students made significant gains in the overall program goals of written expression, reading skills, spelling, and computer literacy as a result of the Writing Express program. Yet teachers did not indicate that their students made significant gains after one thematic unit in the discrete skill areas related to program goals. This failure to show gains in skill areas was confirmed by statistical analyses of the student achievement data.

4. Teachers indicated a need for follow-up training to enable them to implement the program effectively.

5. Teachers need more guidance in teaching writing as a process.

6. Students rarely revised their work.

7. Teachers were rarely observed facilitating students' writing development.

8. Teachers and students had positive attitudes about the program in general.

9. Students enjoyed writing at the computer.

10. Students were familiar with word processing and basic computer technology skills.

Recommendations

1. Provide additional training in the following areas:
   a. techniques of teaching writing as a process,
   b. how to supervise students at the computer so as to review weak students' work and provide alternative work,
   c. ideas for inviting parents, relatives, or other adults to help students (especially with REP and less secure students) with technical skills and to provide support while writing.

2. Encourage a supervisory process which provides for
   a. monitoring performance of the lower 25% of the class and ensuring equal access to the Writing Express program,
   b. ensuring that all aspects of the program are implemented, and identifying possible adjustments to achieve this consistent implementation.

3. Review all existing software on the market (as was done with the Integrated Learning System) to determine if Writing Express is the best and most cost efficient for DeKalb students to achieve the goals of the curriculum.

SUMMARY

Students using the Writing Express program made no significant gains in reading, writing, or spelling when compared to students who did not use the program. In other words, just writing by using the Writing Express program did not improve reading, writing, or spelling skills. Although teachers either expressed or exhibited ambivalent feelings regarding the program, generally they indicted that the program was worthwhile, their students were learning, and their students enjoyed writing at the computer. Yet teachers indicated that time was a factor in preventing their effective implementation of the program indicting that they perceived the program as an addition to a full curriculum. Considering the lack of significant gains in students' reading, writing, and spelling scores, cost must be considered and weighed in relation to program outcomes.

Data support the need for teachers' systematic and appropriate feedback to students in order to improve their writing skills using Writing Express. If teachers did more in the way of assisting students by facilitating their writing, gains might be significant. Ideally, as previously discussed with the program coordinator, training could include more on teaching writing as a process and on incorporating Writing Express as part of the curriculum. In addition, teachers might benefit from visiting successful, established programs and from having opportunities to share ideas with one another. However, these added components to the training would require more than one day of training.

Considering the cost in relation to the outcomes, another less expensive computer word processing program might accomplish the same goal of providing computer experience and having students write at a word processor. Nevertheless, any addition to the curriculum needs to consider teacher training and follow-up for effective implementation.